

Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

Claim 1. Cancelled.

2. (Currently amended) A dispensing device, comprising:

an electrode substrate having a plurality of separate electrodes formed in correspondence with each of a plurality of pressurized chambers to be filled with a solution containing a biological sample;

a pressurized chamber substrate disposed so as to face said electrode substrate in a minute gap, having a discharge mechanism for adjusting the pressure inside said pressurized chamber by mechanical displacement of an elastically deforming diaphragm with an electrostatic force corresponding to a potential difference with said separate electrodes, and discharging said solution from a nozzle hole;

a drive ~~pulse~~ voltage generation circuit, connected between said diaphragm and said separate electrodes, for applying a drive voltage ~~pulse~~ of a prescribed waveform between said diaphragm and said separate electrodes in order to discharge said solution from said nozzle hole;

a ~~drive~~ current detection circuit, which is connected between said diaphragm and said separate electrodes, for detecting a ~~drive~~ current flowing between said diaphragm and separate electrodes ~~when said drive voltage pulse is applied~~ during the period from the rising edge of the pulse of said drive voltage to the termination of discharge of the solution; and

discrimination means for discriminating the existence of a defective discharge of the solution as a result of whether a peak waveform of a differential waveform of the current detected during the period with the current detection circuit appears on the positive side two consecutive times. ~~caused by an insufficient amount of the biological sample being supplied to said nozzle hole based on the drive current detected with said drive current detection circuit; and~~

~~control means for selecting the discharge means in which the discharge status is not defective as a result of discriminating the defective discharge with said discrimination means, and performing discharge control of the solution containing the biological sample.~~

Claims 3-7. Cancelled.

8. (Currently amended) A dispensing device as in claim 2, ~~claims 2, 3, 4, 5, 6, or 7~~, wherein said ~~drive~~ current detection circuit detects said ~~drive~~ current during the period in which said diaphragm elastically deforms toward said separate electrodes or during the period in which said diaphragm elastically deforms away from said separate electrodes.

9. (Currently amended) A dispensing device as in claim 2, ~~claims 2, 3, 4, 5, 6, or 7~~, wherein said discrimination means performs said discrimination by comparing said detected ~~drive~~ current with a pre-stored ~~drive~~ current to be employed upon a normal drive.

10. (Currently amended) The dispensing device according to claim 8, wherein said discrimination means performs said discrimination by comparing said detected ~~drive~~ current with a pre-stored ~~drive~~ current to be employed upon a normal drive.

Claims 11-17. Cancelled.

18. (Currently amended) A dispensing device as in ~~claims 1 or~~ claim 2, further comprising recovery means for recovering the discharge mechanism which resulted in a defective discharge to a normal state.

19. (Currently amended) The dispensing device according to claim 18, wherein said recovery means is suction means of a solution containing a biological sample.

20. (Currently amended) A dispensing device as in ~~claims 1 or~~ claim 2, wherein said biological sample is protein.

21. (Currently amended) A dispensing device as in ~~claims 1 or~~ claim, wherein said biological sample is nucleic acid.

22. (Currently amended) A method of detecting a defective discharge of a solution containing a biological sample in a discharge mechanism for adjusting the

pressure inside said pressurized chamber by mechanical displacement of an elastically deforming diaphragm, which is disposed so as to face an electrode substrate in a minute gap having a plurality of separate electrodes formed in correspondence with each of the plurality of pressurized chambers to be filled with a solution containing a biological sample, with the electrostatic force corresponding to the potential difference with said separate electrodes, and discharging said solution from a nozzle hole, comprising the steps of:

applying, under the control of a drive voltage generator circuit connected between said diaphragm and said separate electrodes, a drive voltage pulse of a prescribed waveform between said diaphragm and said separate electrodes in order to discharge said solution from said nozzle hole;

detecting, under the control of a current detection circuit connected, separately from said drive voltage generation circuit, between said diaphragm and said separate electrodes, a drive current flowing between said diaphragm and separate electrodes when said drive voltage pulse is applied during the period from the rising edge of the pulse of said drive voltage to the termination of discharge of the solution when said drive voltage is applied; and

discriminating the existence of a defective discharge of the solution caused by an insufficient amount of the biological sample being supplied to said nozzle hole based on the detected drive current whether a peak waveform of a differential waveform of the current detected during the period appears on the positive side two consecutive times.

Claims 23-24. Cancelled.

25. (Previously amended) A dispensing method, comprising the steps of:
discriminating a defective discharge of a discharge mechanism with a method according to claim 22 as a preparatory step for spotting a solution containing a biological sample on a substrate; and
selecting a discharge mechanism in which the discharge status is not defective and spotting said solution on the substrate.

26. (Original) The dispensing method according to claim 25, wherein a microarray is prepared by spotting said solution containing a biological sample on an array.

27. (Original) The dispensing method according to claim 26, wherein a protein chip is prepared by employing a large variety of proteins as said biological sample.